

## Australites from Earahedy Station, Western Australia with notes on australites from the nearby Glenayle Station

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**Abstract** – Australites from Earahedy Station totalling 8720 specimens have been classified morphologically and compared with australites from the Eastern Goldfields centred 500 km to the south. The only major difference is the high percentage (15.4%) of flakes and flaked cores in the Earahedy specimens arising from widespread destructive use of australites by Aborigines, though the percentage has been inflated by the manner of collection of the sample. A much smaller and unrepresentative sample of 334 specimens is available from the nearby Glenayle Station. Australites were less abundant than at Earahedy Station but at least equally popular as artifact material. Considerations of specific gravity suggest that they are of the “normal australite” chemical type of Chapman (1971).

### INTRODUCTION

Earahedy Station is centred 25°40'S, 121°49'E in the northeastern corner of the Salt Lake Division of Western Australia (Jutson 1934) and near the geographical centre of the state. The station has a semi-arid climate with large temperature fluctuations and internal drainage to salt lakes and claypans.

Access to additional or enlarged private collections of australites from Earahedy Station has increased the available sample from 2208 to 8720 specimens, thus enabling the upgrading of an earlier statement (Cleverly 1991). Contributions to the supplemented sample are: Western Australian Museum 57, Western Australian School of Mines 1578, A. Quadrio 244, M.K. Quartermaine family 1742, C. Strugnell 51, L.P. Strugnell 4706, T. Wilks 314, C. Ward and others 28. A further 148 australites in the Smithsonian Institution collection (Chalmers *et al.* 1976) and the highly biased W.A. School of Mines item 11597 of 175 specimens were not included in the sample.

### DISTRIBUTION AND RECOVERY OF AUSTRALITES

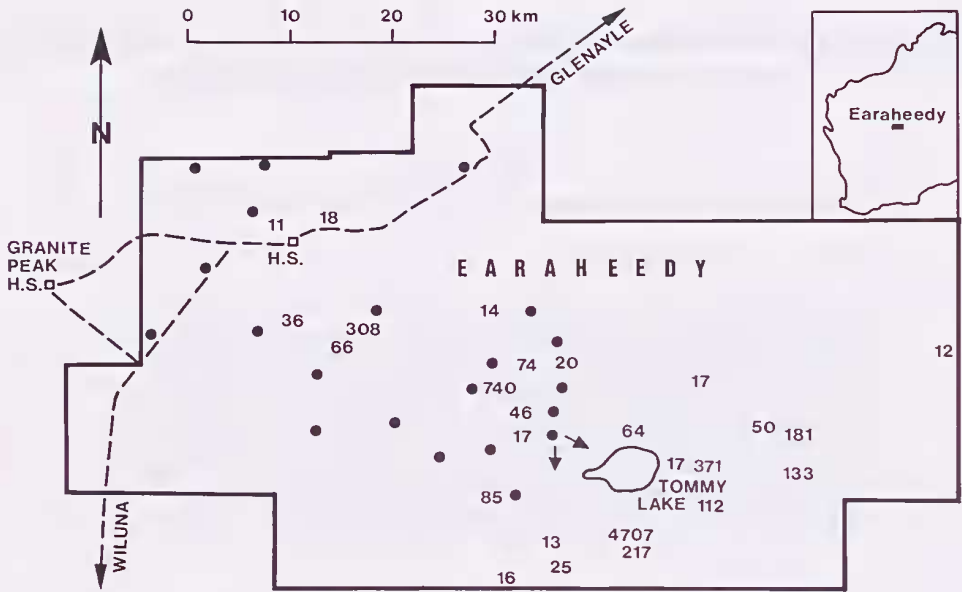
The find sites of 85% of the australites are known, though not all with precision (Figure 1). Nearly 39% of the sample was found by station staff incidentally to their station duties or in subsequent searches of sites already found to be productive. Private and commercial collectors found the other 61% of the sample.

Australites are present on much, probably all, of the station (M.K. Quartermaine, pers. comm.). The

zone of proven occurrence trending southeast from the homestead (Figure 1) is coincident with present station occupancy and activity except for the contributions from private and commercial collectors, especially at the southeastern end of the zone, where australites are unusually abundant.

Some of the australites are closely associated with natural water sources formerly used by Aborigines. The australites found at those sites include numerous flakes and flaked cores. Akerman (1975) identified 93 struck flakes, 27 cores, 23 used flakes and 50 tools, a total of 193 artifacts or 16.4% of the 1179 Earahedy australites in the Western Australian School of Mines collection in 1975, but omitting the biased catalogue item 11597 which is considered elsewhere below. The identification of australite flakes in other collections as artifacts is suggested by their association with flakes of chert and other siliceous rocks around natural sources of drinkable water.

The sites of abundant australite occurrence include Pope Claypan (136 australite flakes and flaked cores/308 australite specimens); Spider Bore with nearby water hole (129/740); Neville Claypan (37/66); Hamilton Claypan (50/90); an area south and southeast of Hegarty Bore including the freshwater Tommy Lake (474/4707). The list could be extended by citing minor recoveries e.g., the claypan south of Ian Bore (8/24). The only figures available for other basins are 11/314 or only 3.5% flakes for australites collected by T. Wilks from two small basins described as “salt lakes” in the eastern part of the station. Australites were probably brought to the water sources from the immediately surrounding country but there was no need for



**Figure 1** Map of Earaaheedy Station showing numbers of australites at their find sites. Small filled circles represent 1–10 australites. The provenance of the Strugnell collections of 4757 specimens to the “south and southeast of Hegarty Bore” is shown diagrammatically by arrows. The parcels of 36 and 112 australites are in the Smithsonian Institution collection and are not part of the sample examined.

them to be imported from outside the station because un-flaked specimens greatly predominate in all collections contributing to the sample.

#### AUSTRALITE FEATURES AND SHAPES

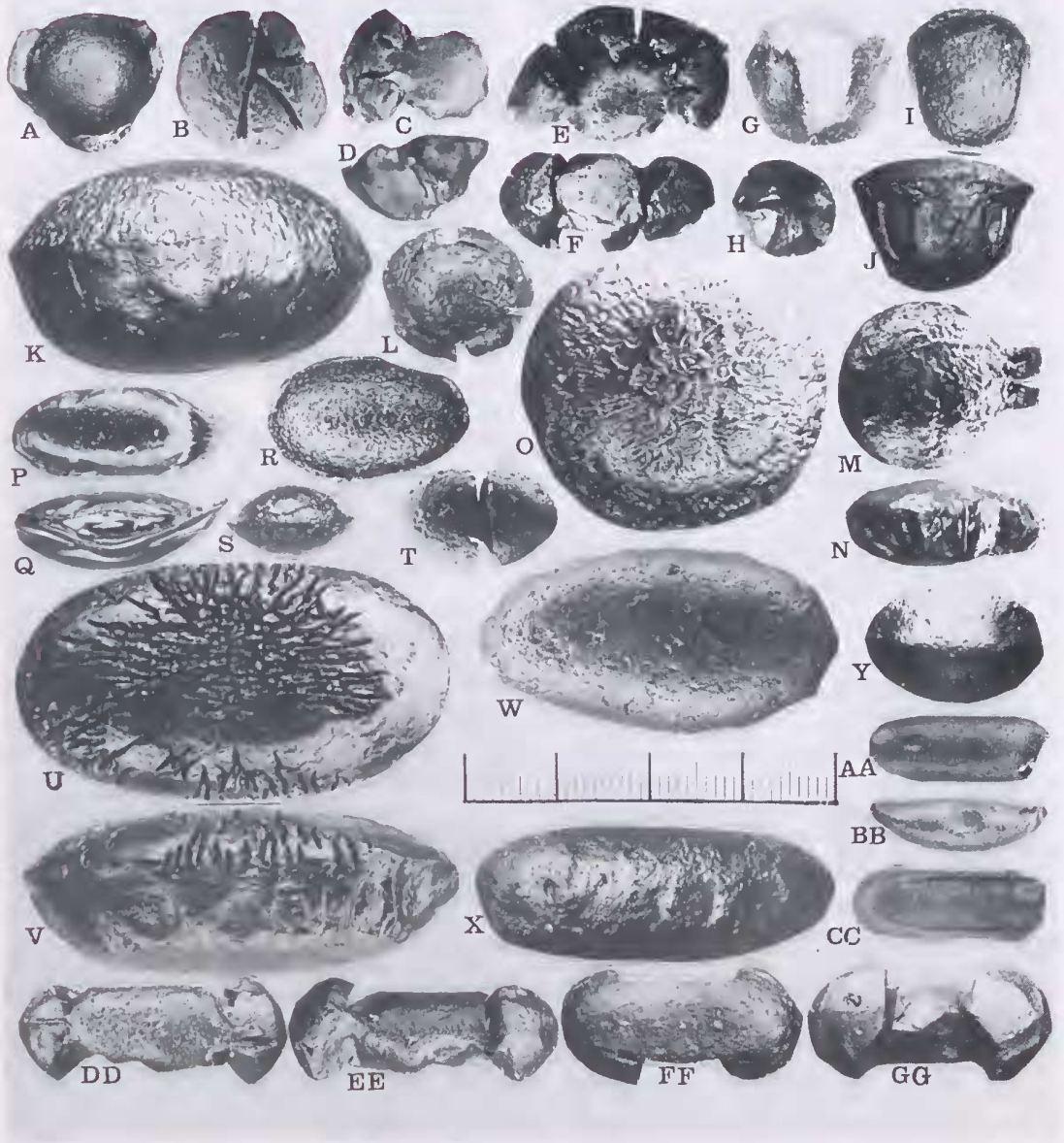
Some of the considerable variety of features shown by 21 of the 34 shape types in the Earaaheedy material are shown in Figures 2 and 3. Examples of small bowls, of which there are 65 in the sample, have been shown previously (Cleverly 1973); likewise, for examples of the 106 aberrant specimens, see Cleverly (1982). Two circumferentially spalled specimens, perhaps heated suddenly in grass fires, have been figured by Cleverly (1990, figure 3).

Some of the australites on Earaaheedy Station were subjected to abrasion, especially by blown sand (Figures 2W, X; 3E, F). As a result of weathering, especially temperature changes, australites were degraded through a series of shapes (Cleverly 1986, figure 3). In this series, indicators II are especially well represented at Earaaheedy (Figures 2C, M, DD; 3D, H, O). Etching by the chemicals in soil water to produce pits and sawcuts (Figure 2B–F, T, DD–GG) is also evident though Earaaheedy Station now has a generally dry, sub-arid climate. V-grooves relieving residual strains (Figure 2U) and U-grooves (Figure 2K, O)

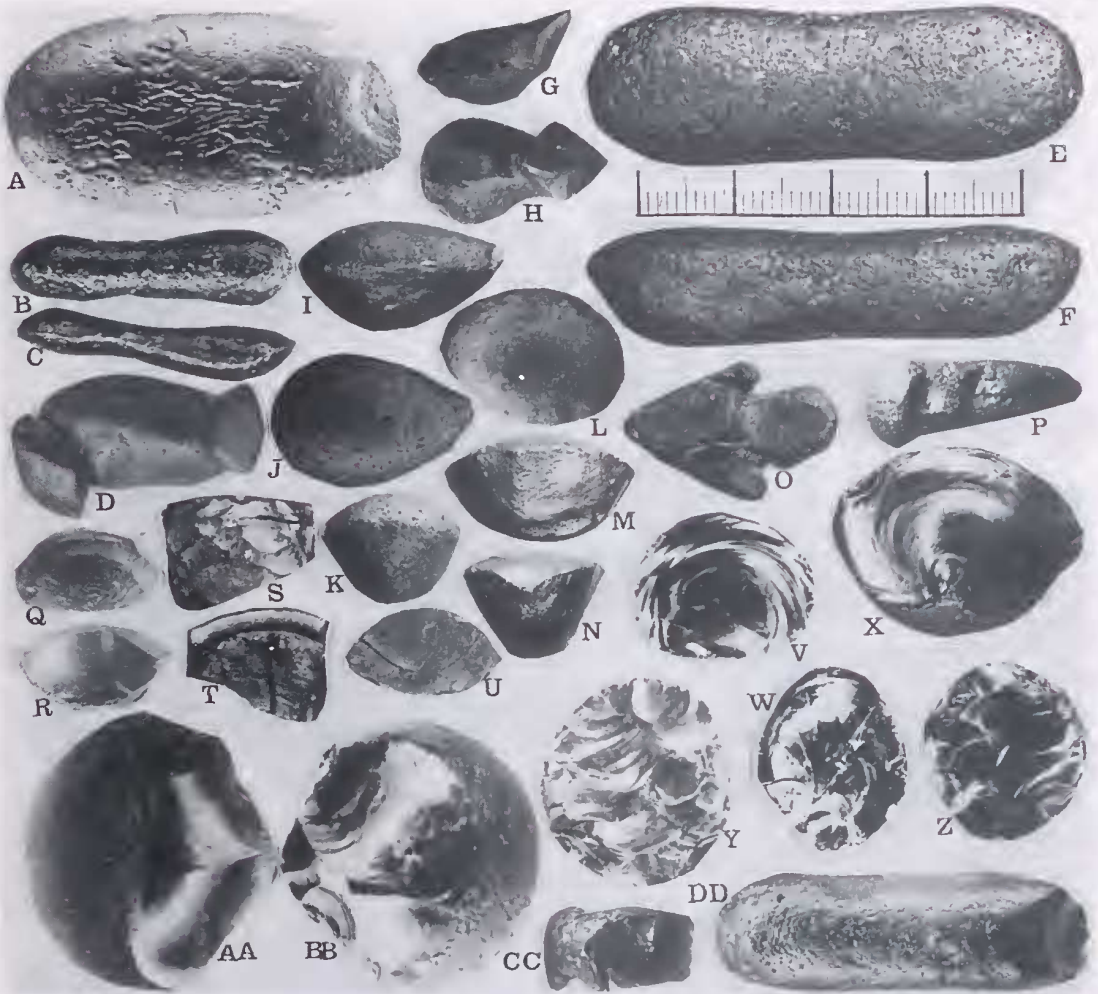
are etched on the posterior surfaces of larger cores, and less commonly, U-grooves are etched upon anterior surfaces created by loss of the stress shells.

No australite weighing more than 100 g is present though Earaaheedy Station is marginal to the western of two sectors of occurrence of such specimens (Cleverly and Scrymgour 1978). The heaviest Earaaheedy australite is a naturally broken broad oval core weighing 68.6 g or c. 73 g prior to artificial damage. There are 165 australites (1.9% of sample) of weight 10 g or more, about the same abundance as for Hampton Hill Station in the Eastern Goldfields (394 such specimens, or 1.8% of the 22 307 australites).

A notable feature of the Earaaheedy australites is the high number of them – 9043 in collections inclusive of the 323 left out of the sample, and an unknown number sold to lapidaries and mineral dealers. One of the excluded items is W.A. School of Mines catalogue No. 11597 comprising 175 specimens rejected from a parcel offered for sale. Akerman (1975) identified 116 artifacts (struck flakes, used flakes, tools, cores) in this rejected material. A parcel of average constitution would have included several hundred additional unflaked australites. Amongst Western Australian localities, only Hampton Hill Station has a higher representation in collections.



**Figure 2** Australites from Earahedy Station, Western Australia. ps signifies posterior surface of flight, se side elevation, ee end elevation. In elevational views, direction of flight is towards bottom of page. Scale in centimetres and millimetres. A: ps of round indicator I. B: ps of lens distorted by sawcuts. C and D: ps and se of round indicator II. E and F: Major surface and side view of round indicator II, orientation uncertain. G: se of faceted round core. H: as of faceted round core. I: se of stopper type round core. J: se of round core with ovoid "flake" scars. K: se of round core. L: ps of broad oval lens losing stress shell along sawcuts. M and N: ps and ee of broad oval indicator II. O: ps of broad oval core. P and Q: ps and se of narrow oval canoe, one end lost. R and S: ps and ee of narrow oval lens with stubs of flange. T: as of narrow oval lens with transverse sawcut. U and V: ps and se of narrow oval core. W and X: ps and se of tapering narrow oval with remnants of "flake" scars. Y: as of wedged narrow oval core. AA and BB: ps and se of abraded boat-lens ex canoe. CC: ps of flanged dumbbell, incomplete. DD and EE: ps and as of boat-indicator II. FF and GG: ps and as of boat-indicator II.



**Figure 3** Australites from Earaaheedy Station, Western Australia. ps signifies posterior surface of flight, as anterior surface, se side elevation, ee end elevation. In elevational views, direction of flight is towards bottom of page. Scale in centimetres and millimetres. A: ps of boat-core broken through bubble crater. B and C: ps and se of dumbbell-lens. D: as of half-dumbbell indicator II. E and F: ps and se of abraded dumbbell-core. G: se of teardrop-lens. H: as of teardrop-indicator II. I, J and K: se, ps and ee of teardrop-core. L, M and N: ps, se and ee of conical core. O: as of broken elongate indicator II, so-called "trilobite". P: se of broken elongate indicator II, "club" form. Q and R: flow-ridged outer and spalled inner surfaces of fragment of stress shell. S and T: flow-ridged outer and spalled inner surfaces of composite flange-stress shell fragment. U: Broken lens-form losing stress shell along sawcuts. V: Flake. W: Flake with radial percussion ribbing. X: Flaked core. Y: Worked flake. Z: Worked flake. AA and BB: Two views of a pointed australite tool. CC: Small chisel-shaped tool ex elongate indicator II, other side similar. DD: Chisel-shaped tool ex stout-waisted dumbbell-core, other side closely similar.

#### COMPARISON BETWEEN AUSTRALITES FROM EARAAHEEDY STATION AND FROM THE EASTERN GOLDFIELDS

The sample was classified morphologically and extracts from the classification with weight data are presented in Table 1 using the system and procedure of Cleverly (1986). The mean values and standard deviations for eight samples from the

Eastern Goldfields centred about 500 km to the south are also given in Table 1. A comparison is made because both Earaaheedy Station and the Eastern Goldfields have an arid to sub-arid climate and internal drainage, and are within the field of occurrence of the "normal australite" chemical type (Chapman 1971).

The only major difference between the Earaaheedy

**Table 1** Comparison between australites from, 1, Earraheedy Station (this work) and, 2, eight samples from the Eastern Goldfields of Western Australia, mean and standard deviation (Cleverly 1994).

	1		2	
	Mean	S.D.	Mean	S.D.
1 Whole forms or essentially so %	29.8	38.2	9.5	
2 Incomplete but classifiable %	11.4	12.8	2.2	
3 Total classifiable %	41.2	51.0	9.8	
4 Fragments and indeterminate %	43.4	47.9	9.9	
5 Flakes and flaked core %	15.4	1.1	1.1	
6 Round forms %	69.7	69.0	7.9	
7 Broad oval forms %	11.1	8.2	3.5	
8 Round plus broad oval forms %	80.8	77.2	4.6	
9 Narrow oval forms %	6.9	7.6	2.0	
10 Boat forms %	2.5	5.1	0.8	
11 Dumbbell forms %	6.0	7.2	1.5	
12 Teardrop forms %	3.8	3.0	1.7	
13 Aberrant forms as a percentage of classifiable	2.9	3.0	0.9	
14 Flanged, disk and plate, bowl and canoe forms %	2.7	2.4	3.0	
15 Indicators I %	0.8	1.7	1.4	
16 Lens-forms %	53.1	60.4	11.1	
17 Indicators II	2.4	1.2	1.1	
18 Cores including conical %	41.0	34.2	11.0	
19 Cores/lens-forms ratio	0.77	0.61	0.27	
20 Number of whole australites	2599			
21 Mean weight of whole australites (g)	3.30	2.75	1.07	
22 Total number of specimens	8720			
23 Mean weight of all specimens (g)	2.10	1.87	0.57	
24 Number of shape types in sample	34			

and the Eastern Goldfields australites is the high percentage of flaked specimens – 15.4% at Earraheedy, 1.1% in the Goldfields (Table 1, item 5). The abundance of flaked australites collected at sites over a length exceeding 50 km is unique in the writer's experience. In the Mount Remarkable–Yerilla portion of the Eastern Goldfields, about one third of the available specimens were flakes, but they were from a single water source (Cleverly 1988). The use of australites at Earraheedy appears to have been general, at least throughout the area which is well represented in the sample. Flakes and flaked cores constitute 28.4% of the 1319 australite specimens collected from fresh water claypans, and because collectors returned continually to those productive sites, the abundance of flakes in the overall sample (15.4%) is a slightly inflated figure.

A minor difference between the Earraheedy and Eastern Goldfields samples is the low percentage of boat forms – 2.5% compared with 5.1% (Table 1, item 10).

The mean weight of 3.30 g for whole australites is within the usual range of  $2.75 \pm 1.07$  g for those

of the Eastern Goldfields (Table 1, item 21); similarly, the mean weight of 2.10 g for all specimens conforms with  $1.87 \pm 0.57$  g for the Eastern Goldfields (Table 1, item 23).

Thirty four shape types are present in the sample, a figure within the range c. 28 – 40 for an Eastern Goldfields sample of comparable size (Cleverly 1994).

## CONCLUSION

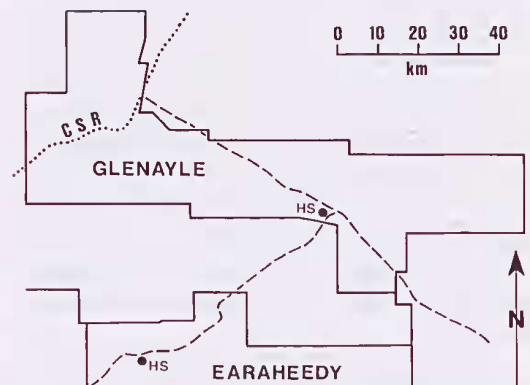
Australites from Earraheedy station are similar in major features to those of the Eastern Goldfields except in the abundance of flaked specimens, and that is an artificial feature resulting from their destructive use by Aborigines.

## NOTES ON AUSTRALITES FROM GLENAYLE STATION

Glenayle Station is north of Earraheedy Station with much of the intervening country unoccupied (Figure 4). The following australites found on Glenayle Station were available for examination.

1. Twenty specimens from the claypan 1 km east of the homestead (Western Australian School of Mines collection).

2. Ms J. Ward's collection of 257 australites from places as far west as Scorpion Bore (67 km west-northwest of the homestead and on the Canning Stock Route) to near the eastern boundary and to within a few kilometres of the far northern boundary. A major, but indistinguishable and unspecified, component of this collection was gathered meticulously from the claypan 1 km east of the homestead. The numerous small flakes in this component are responsible for the unusually low average weight of 1.05 g for the collection. Australites are known to the Ward family as "moppins" from an Aboriginal word, probably a



**Figure 4** Map showing location of Glenayle Station relative to Earraheedy Station. CSR signifies Canning Stock Route.

variant or corruption of "mappin", meaning "emu stones", a word used by Aborigines for australites in Western Australia (Baker 1957). Emus frequently use australites as gizzard stones (Fenner 1949).

3. Mr H.W. Ward's collection of 39 australites, most found singly at points throughout the station during his 46 years of occupation. These more obvious specimens were collected casually, not as a result of intended search and have the very high average weight of 6.95 g.

4. Eighteen specimens found by W.H. and E.I. Cleverly during a brief reconnaissance of the central part of the station. Two australite flakes were found in claypans west of Sunday Well, 31 km eastnortheast of the homestead. Fifteen flakes/flaked cores and one whole specimen (probably too small for use) were found on the slope overlooking Jilca Soak from the south, 8 km west of the homestead. Flakes of chalcedony, quartzite and other siliceous materials were plentiful at the recovery sites and broken grinders and base stones were especially abundant at Jilca Soak. No australites were recovered during any of 20 brief searches at a distance from sources of fresh water, though other flaked materials were ubiquitous.

The 334 australites have general morphological classification:

Whole forms or essentially so	57
Incomplete but classifiable	31
Total classifiable (Cleverly 1986)	88
Fragments and indeterminate	66
Flakes and flaked cores	180

All four units in the sample contain flakes or flaked cores, which constitute 54% of the sample in contrast to the mean 1.1% in Eastern Goldfields samples (Table 1, item 5). A detailed statement using the classification and procedure of Cleverly (1986) is inappropriate because most items of the Table would be based upon 88 or fewer specimens. Moreover, there is bias of location and/or australite size in all four units in the sample. However, some general conclusions are possible.

Australites are (or were) sparsely but widely present over much of Glenayle Station. They were popular with Aborigines as artifact material and are now present largely as flakes and flaked cores in or around the sources of fresh water. When considered in conjunction with the collections from Earahedy Station, it is likely that the destructive use of australites was prevalent over a very large area with a northsouth dimension of more than 80 km, though abundant alternative materials were available.

Specific gravities were determined for 100 australite specimens representing proportionally all four units in the sample. The frequency polygon of specific gravity with a single strong mode in the 2.45–2.46 interval and lack of values exceeding 2.47

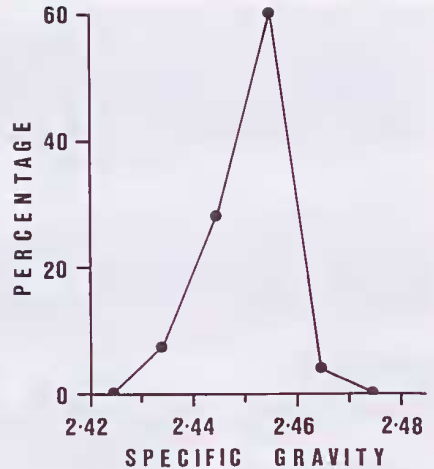


Figure 5 Frequency polygon of specific gravity at 0.01 unit intervals for 100 australites found on Glenayle Station, Western Australia.

(Figure 5) is typical of the "normal australite" chemical type which is present also at Earahedy Station (Chapman 1971).

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